The FireLoc Project: Identification, Positioning and Monitoring Forest Fires with Crowdsourced Data

Cidália C. Fonte, Alberto Cardoso, Jacinto Estima, José Paulo Almeida and Joaquim Patriarca (Portugal)

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SUMMARY

The severity and impacts of forest fires have increased in the last years in several parts of the world, such as Australia and California, where devastating fires occur now almost every year, but also in Europe, where, for example, in Portugal and Sweden large fires occurred in 2017 and 2018, respectively. As these types of events are likely to increase due to climate changes, it is important to develop tools to assist in the early identification and geolocation of ignitions so that they can be reached by the authorities as fast as possible.

Several types of systems are used and under development to detect automatically fires based on, for example, thermal cameras and observation towers, but the more systems available to detect these events and identify their location at an early stage the better. This motivated the design of the FireLoc project, currently under implementation, that aims to develop a system that enables the citizens to provide georeferenced data to assist in the detection and geolocation of spotted fires in real time.

The FireLoc system allows to:

i) report a potential fire spotted by any volunteer citizen provided with a smartphone, along with the automatic geolocation of the observer (i.e., place of observation), a photograph of what is being observed, and data enabling to geolocation of the observed phenomenon - namely, the orientation (automatically picked up from the smartphone) and the approximate distance between the observer and the observed event (reported by the volunteer);

ii) pre-process each contribution to assess its credibility, based on the received data (i.e., geolocation and photograph) and the information available for the surrounding area, such as land

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use and land cover data, proximity of vegetation and visibility to forested areas;

iii) integrate and process the data submitted by the volunteers, extracting information on geolocation, severity and extent of the observed phenomena.

This system comprises three main components:

i) a data collection component (the FireLoc app) developed for mobile platforms;

ii) a data integration and processing component, which includes a geospatial component, and therefore will be developed using Geographic Information Systems software, and will allow the evaluation of the credibility of the reported information, including the identification of the events' geolocation and their geospatial extent;

iii) a component for providing information to the general public and institutions (including civil protection authorities), with different user profiles, developed for both mobile and desktop platforms, allowing to monitor the progress of the reported event.

This paper will detail the different components of the FireLoc project, the main challenges that are faced to obtain reliable geolocation of the observed events, and preliminary results obtained with the first rounds of collected data.